

Appl. No. 10/506,701  
Amdt. dated November 13, 2006  
Reply to Office Action of October 11, 2006

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Please cancel claims 2 and 9-45 without prejudice, amend claims 3 and 5, and add new claim 46 as follows:

1. (original) A DME fuel supply device for a diesel engine having:
  - a feed pump for pressurizing DME fuel in a fuel tank to a specified pressure and delivering it into a feed pipe;
  - an injection pump for delivering DME fuel in a fuel gallery into which the DME fuel delivered via the feed pipe flows in a specified amount to an injection pipe communicated with a fuel injection nozzle of the diesel engine at specified timing;
  - an overflow fuel pipe for returning DME fuel overflowed from the fuel injection nozzle and DME fuel overflowed from the injection pump to the fuel tank; and
  - residual fuel retrieving means for retrieving DME fuel remaining in the fuel gallery and the overflow fuel pipe after stopping the diesel engine into the fuel tank;
- the DME fuel supply device comprising:
  - a vapor-phase pressure delivery pipe switching solenoid valve for opening and closing the vapor-phase pressure delivery pipe.
2. (canceled)
3. (currently amended) The DME fuel supply device for a diesel engine

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according to claim 1-~~or~~2, wherein the residual fuel retrieving means has an aspirator which is disposed between the feed pipe and the overflow fuel pipe and which returns DME fuel delivered from the feed pump to the fuel tank so that the DME fuel remaining in the fuel gallery and the overflow fuel pipe can be drawn by the returning DME fuel and retrieved into the fuel tank.

4. (original) The DME fuel supply device for a diesel engine according to Claim 3, wherein the residual fuel retrieving means has a first solenoid valve for communicating a delivery port of the feed pipe with either an inlet to a circulation passage of the aspirator or an inlet to the fuel gallery; a second solenoid valve for opening and closing the communication of a suction port of the aspirator with the fuel gallery and the overflow fuel pipe; and a DME fuel retrieving control section for performing control to switch the first solenoid valve to communicate it with the inlet of the aspirator and open the second solenoid valve to form a passage for returning the DME fuel delivered from the feed pump to the fuel tank and open the vapor-phase pressure delivery pipe switching solenoid valve and to close only the vapor-phase pressure delivery pipe switching solenoid valve after a lapse of a predetermined period of time.

5. (currently amended) The DME fuel supply device for a diesel engine according to Claim 1-~~or~~2, wherein the injection pump has an injection pump element having a delivery valve which can be opened and closed by up-and-down movement of a plunger in engagement with a camshaft rotated by rotation transmitted from a driving shaft of the diesel engine and which can deliver the DME fuel in the fuel gallery into which the DME fuel delivered from the fuel tank via the feed pipe flows in a specified amount to an injection pipe in communication with a fuel injection nozzle of a diesel engine at specified timing; and injection state switching

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means for switching the injection pump element between an injection state in which the delivery valve is opened and closed by a cam of the camshaft and a non-injection state in which the delivery valve is not opened and closed even when the plunger is moved up and down by the cam, and wherein the injection pump element allows communication between the injection pipe and the fuel gallery even if the delivery valve is closed only in the non-injection state.

6. (original) The DME fuel supply device for a diesel engine according to Claim 5, wherein the plunger of the injection pump element has a generally cylindrical shape and is rotated circumferentially in a plunger barrel by the injection state switching means, and the injection amount of the DME fuel is changed according to the rotational position of the plunger, and wherein the injection pump element is brought into the non-injection state and a purge passageway for communicating the injection pipe and the fuel gallery is formed when the plunger is rotated to such a rotational position that the injection amount is zero.

7. (original) The DME fuel supply device for a diesel engine according to Claim 6, wherein the injection pump element has a delivery valve holder having a delivery valve insertion hole communicated with the injection pipe; a delivery valve received in the delivery valve insertion hole for reciprocating movement; a delivery valve seat disposed integrally with the delivery valve holder and having a valve seat part for shutting off the communication between the injection pipe and the fuel gallery to establish a valve-closed state when a valve part of the delivery valve comes into contact with it; a delivery spring for urging the delivery valve toward the delivery valve seat; a plunger barrel disposed integrally with the delivery valve seat and having a compression chamber communicated with the delivery valve seat; a plunger received in the compression chamber for reciprocating movement and having an end opposed to the delivery

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valve; and a plunger spring for urging the plunger toward the cam,

wherein, when the injection pump element is in the injection state, the plunger is pushed up from the valve-closed state by the cam to shut off the communication between the compression chamber and the fuel gallery, the DME fuel in the compression chamber pushes up to open the delivery valve and brings the delivery valve into an open state, the DME fuel in the compression chamber is delivered under pressure to the injection pipe through the delivery valve in the open state, the compression chamber and the fuel gallery are communicated with each other again via a notch formed in an outer peripheral surface of the plunger, and the liquid pressure in the compression chamber is decreased and the delivery valve is closed by the urging force of the delivery spring, and

wherein, when the injection pump element is in the non-injection state, the plunger is rotated circumferentially by the injection state switching means to such a rotational position that a purge groove formed in an outer peripheral surface of the plunger and a purge port formed in an inner peripheral surface of the plunger barrel are communicated with each other, and the injection pipe and the fuel gallery are communicated with each other via the purge port, the purge groove, and a purge passage formed in the delivery valve seat for communicating the injection pipe and the purge port.

8. (original) The DME fuel supply device for a diesel engine according to Claim 5, wherein the injection pump has a cam chamber in which the camshaft is placed and lubricating oil is reserved and which has an exclusive lubricating system separated from a lubricating system of the diesel engine, and wherein an oil separator for separating DME fuel from lubricating oil containing the DME fuel and a compressor driven by a cam of the camshaft for

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pressurizing the separated DME fuel and delivering it to the fuel tank are disposed in the cam chamber.

9-45. (canceled)

46. (New) A suction assisting device, provided in a DME fuel supply device for a diesel engine for supplying DME fuel from a fuel tank to an injection nozzle of the diesel engine via a fuel gallery having an overflow fuel pipe for returning the DME fuel overflowed from the fuel injection nozzle and the DME fuel overflowed from the fuel gallery to the fuel tank; and residual fuel retrieving means for retrieving the DME fuel remaining in the fuel gallery and the overflow fuel pipe after stopping the diesel engine to the fuel tank, for assisting the residual fuel retrieving means to suck the residual DME fuel, comprising:

a vapor-phase pressure delivery pipe communicating the fuel gallery's inlet side of a feed pipe connecting the fuel tank and the fuel gallery with a vapor phase in the fuel tank; and

a vapor-phase pressure delivery pipe switching solenoid valve which is provided in the vapor-phase pressure delivery pipe and which is opened after stopping the diesel engine,

wherein the residual fuel retrieving means is assisted to suck the residual DME fuel when the vapor phase in the fuel tank is communicated with the fuel gallery as a result of the vapor-phase pressure delivery pipe switching solenoid valve being opened after stopping the diesel engine.